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ABSTRACT

North American cities have long encouraged redevelopment of their downtown cores to counteract the flight of residents and business to the suburbs in the postwar period. Building subsidized arenas and stadiums for professional sports teams downtown became common in the 1960s. In recent years, downtown stadiums and arenas have been proposed as components in larger redevelopment projects containing a number of other amenities, as well, including housing and other entertainment attractions. The justification for such developments rests in part on the public goods generated by vibrant, prosperous downtowns. Yet little is known about the value of such downtown public goods. This paper reports the results of two Contingent Valuation Method surveys to determine willingness to pay for new National Hockey League arenas in downtown Edmonton and Calgary in the Canadian province of Alberta. The hypothetical scenarios in both surveys varied to include affordable housing, a casino, and cultural space in addition to the arena. The surveys provide the first estimates of willingness to pay for downtown public goods for sports arenas, and also provide the first estimates of scope effects, that is, the willingness to pay for expansions of public goods, in the sports economics literature.

INTRODUCTION

Ever since postwar suburbanization and urban sprawl precipitated the decline of downtown central business districts in North American cities, local and regional economic development policy has focused on revitalizing downtowns (Mitchell, 2001; Robertson, 1995). In part, the policies promoting downtown may have been motivated by the belief that central business districts – representing the heaviest concentrations of economic activity in cities – drive growth, and therefore vibrant downtowns are key to a city’s economic sustainability (Hannigan, 1998; Harvey, 1989)). In addition, the notion that downtowns produce unique and valuable intangible benefits for their cities has also shaped policies promoting urban growth, where downtowns can become exciting, bustling areas for locals to live and work, and tourists to visit (Eisinger, 2000; Turner, 2002)). At the same time, there has been growing discourse surrounding the competitiveness of cities, as civic leaders attempt to reinvent their respective communities in order to draw in, or retain, tourism, business investment and, ultimately, to meet the needs of the taxpayers who live there (Begg, 1999). As a result, the downtown has become a key site for pro-growth supporters to champion various urban development projects, including convention centres, new housing, casinos, aquariums, shopping centres, and other amenities thought to make downtowns more desirable locations to visit, live, or work in (Altshuler & Luberoff, 2003; Clark, 2004).

Although considerable academic research has explored pro-growth agendas in various North American cities (cf. Elkin, 1987; Logan & Molotch, 1987; Stone, 1989), and evaluated the specific projects that have been developed (cf. Rosentraub, 2010), little is known about how

taxpayers paying for this infrastructure value such development. In addition, while research has examined the specific development projects themselves, it has not evaluated the public goods produced for their host communities. In this paper, we further explore the public goods value that vibrant downtowns potentially confer to local residents.

The public goods produced by healthy downtowns have been described in many ways. A prosperous downtown benefits a city because its residents have “a cultural attachment to Main Street” (Mitchell, 2001, p. 115). Downtowns “give identity, meaning, and character” to urban regions (Ford, 2003). Downtowns influence a city’s image to the rest of the world, give it a sense of identity, serve as a source of civic pride, and provide a venue for mixing among different socio-economic classes (Rosentraub, 2008).

As a result, cities seeking to reinvent or reposition themselves in an urban hierarchy have focused on more comprehensive development that involves a number of “anchor” projects (Lehrer & Laidley, 2008; Orueta & Fainstein, 2008). However, this is not a simple process, and often involves many discrete development projects over a number of years, or even decades (Levine, 1987). One strategy for revitalizing downtowns has proven widely popular in the North American context—using public money to build downtown stadiums and arenas for professional sports teams. Since the early 1990s, many cities, including Baltimore, MD, Cincinnati, OH, Cleveland, OH, Indianapolis, IN, and San Diego, CA, have built at least one publicly funded major league stadium or arena to boost activity in their respective downtowns (Rosentraub, 2008). Many others, including Durham, NC, Dayton, OH, and Louisville, KY, have built minor league stadiums in their downtowns. However, these projects tend to be evaluated in terms of their individual impacts on their respective cities. This is problematic, as any specific

development project is not designed to be a standalone entity; rather, it is part of a broader, more comprehensive development plan. Thus, such projects should be treated as components in a broader strategy and their impacts should be considered accordingly. Seen in this manner, sports facilities should not simply be viewed in terms of their own tangible and intangible benefits. Instead, they should be viewed in terms of how they contribute to the overall urban development agenda. Where sports facilities are placed in downtown cores as part of revitalization efforts, the benefits should be viewed in terms of the ability of the facility to help meet that aim.

For this reason, if public money is used to fund a sports facility as part of creating a more vibrant downtown, then the issue to explore is not the public goods that a sports facility (and the related franchise) confers. Instead, the issue is whether or not it is a wise investment to spend public money to build a facility to make the downtown more vibrant. In this case, then, it is the potential public goods value of the arena to make the downtown more vibrant that is the relevant subject to explore.

This is an important question because, despite the arguments put forth by proponents, a vast economics literature has developed since the 1980s to repeatedly, convincingly, and virtually unanimously refute the claim that stadiums and their teams increase a metropolitan area's income, employment, or tax revenues. (See, for instance, Baade and Dye, 1988; Quirk and Fort, 1992; Noll and Zimbalist, 1997; Coates and Humphreys, 1999). Since the existence of a new stadium or team does not affect household budget constraints, if a stadium increases economic activity downtown, economic activity falls in other neighborhoods in the metropolitan area. (Coates, 2007, p. 568). However, if there is a public goods value to placing the facility downtown as opposed elsewhere in the city, then this might provide some evidence for allocating

some public funds to the construction of the facility. Identity, civic pride, and the other intangible benefits have the qualities of public goods—they are nonexcludable and nonrivalrous. As public goods they are likely to be under-produced without a subsidy. If stadiums and arenas do contribute to healthier, more prosperous downtowns, subsidizing them could enhance economic efficiency if the value of the public goods produced exceeds the cost of the subsidy. In other words, if downtowns can produce public goods more efficiently than other neighborhoods can, subsidizing downtown stadiums and arenas may be economically efficient.

But how would anyone know what the value of civic pride and community identity is? With no market for such goods, there are no data on prices and quantities, no data on willingness to pay. Contingent Valuation Method (CVM) surveys, developed to value environmental public goods, offer a way to estimate the value of downtown public goods. Economists have been using CVM to value sports public goods for several years, focusing on willingness to pay to keep existing teams, such as hockey's Pittsburgh Penguins (Johnson, Groothuis, and Whitehead, 2001), football's Jacksonville Jaguars (Johnson, Mondello, and Whitehead, 2007), and on willingness to pay to attract new teams such as a basketball team to Jacksonville (Johnson, Mondello, and Whitehead, 2007), and a baseball team to Portland (Santo, 2008). The Contingent Valuation Method has also been used to estimate the value of public goods from hosting the Olympics (Atkinson, Mourato, Szymanski, 2008).

This paper employs CVM surveys to extend the literature in urban economics to estimate willingness to pay for downtown public goods such as civic pride and community identity from building new National Hockey League (NHL) arenas in Edmonton and Calgary, Alberta.

This paper also tests whether the current penchant for using stadiums and arenas to anchor diversified downtown developments, including elements such as other entertainment venues, housing, and cultural facilities, might be justified by greater public goods produced by diversified developments. The results provide the first evidence in sports CVM studies of scope effects, that is, the willingness to pay different amounts for varying quantities of public goods. Scope effects exist when variations in quality or quantity of a good or service affect willingness to pay. Until now, the lone published sports CVM study to address scope effects is Johnson, et. al. (2007), which asked about willingness to pay for either 2 percent or 10 percent expansions in amateur participatory sport and recreation programs. That study, however, found no scope effects, since the extent of the program expansion did not affect willingness to pay.

In the next sections of the paper we describe the theory, the survey and the sample. Then we describe the CVM scenario and provide estimates of willingness to pay. Next, we estimate probit models of the determinants of willingness to pay. In the conclusions we consider the aggregate benefits of downtown arenas and compare these to their costs. The results suggest that people do value downtown arenas, but their willingness to pay may not exceed the extra cost of building downtown rather than in the suburbs.

THEORY

To illustrate the economic theory serving as the foundation for CVM analysis in this paper, consider the following example. Suppose Jane achieves a certain reference level of utility from her consumption of goods and services, including any local public goods, such as civic pride and identity, produced by the downtown district. If she is rational, she will achieve this reference level of utility by minimizing her expenditures on private goods, including any that are

produced downtown, to achieve that reference level of utility. By definition, she spends nothing on the public goods she consumes.

Now suppose a new hockey arena is built downtown. The arena may increase Jane's utility in one of two ways. First, it may result in the more efficient production of private goods that appeal to Jane, by producing new goods that were not previously available, reducing the cost of producing goods that Jane is already consuming, or by enhancing the quality of private goods that she is already consuming. Second, the new arena may produce more public goods that Jane values. If either or both of these things occur, Jane's utility will rise, meaning that to achieve the reference level of utility, she will not have to spend as much on private goods as she did before the new arena. For instance, if she spent \$50,000 per year on private goods before the enhancement of downtown, she might be able to spend \$49,900 per year and still achieve her reference level of utility after downtown begins to produce more of the goods she values. The \$100 difference in the two spending levels is defined as her annual willingness to pay for the enhanced downtown.

The total willingness to pay comprises two elements, the willingness to pay for the enhanced public goods, or non-use value, and the willingness to pay for the enhanced private goods, or use value. In the example above, if Jane values the enhanced public goods by \$30, her non-use value for the new arena is \$30, while her use value of the enhanced private goods is \$70, for a total willingness to pay of \$100.

If Jane is unwilling to give up any private goods she currently consumes for a downtown arena, her combined use and non-use value for the arena is \$0. Perhaps she does not believe a downtown arena would produce more public goods, or that she would derive additional utility from more public goods. If willingness to pay were zero, it would also mean she does not believe

the arena would produce additional private goods of interest. In this scenario, there would be no justification for using public money in order to construct the arena in a downtown location.

SURVEY AND SAMPLE

To answer whether and how much people are willing to pay for a downtown arena, a survey was conducted in Calgary and Edmonton, Alberta. Edmonton and Calgary were chosen as subjects because of ongoing discussions in both cities about new arenas for their NHL teams. The Edmonton Oilers play in Rexall Place, one of the NHL's oldest arenas, located just outside that city's downtown core. Built in 1974, Rexall Place lacks the premium seating and other revenue-generating amenities found in the current generation of NHL arenas, rendering it economically obsolete (Mah, 2007). As a result the Oilers have asked for a new arena. At the time of the survey, in 2007, one of the major unresolved questions was whether to build a new facility near Rexall Place, renovate the existing facility, or build it in the downtown core.³ Similarly, the Calgary Flames also plays in an old arena, the Scotiabank Saddledome, built in 1983. The question of where to build was and remains an issue in Calgary.

The survey instrument consisted of a Computer-Assisted Telephone Interviewing (CATI) questionnaire. Pre-testing the survey instrument on 60 randomly called people resulted in minor refinements to the survey before calling the sample. Using a random sample frame of land-line telephone numbers for Alberta, interviews were conducted with 339 adults in metropolitan Edmonton and 331 in metropolitan Calgary. The initial screening questions selected male and females aged 18 or older. To meet pre-established quotas for each city, some dialed numbers were excluded because they were not in service, no one answered, or other technical reasons.

³ Since that time, the City of Edmonton and the owner of the Oilers have reached a tentative agreement to build a new arena downtown.

Others were excluded because they were business faxes, or because the person answering could not speak English or was under 18 years old. The overall response rate among the eligible numbers dialed was 33 percent.

Of the 670 completed interviews with Edmonton and Calgary metropolitan respondents, we discarded cases based on item nonresponse to the willingness-to-pay and other key questions, resulting in a sample of 607. Table 1 presents socioeconomic information for the sample. Three hundred respondents are in the Calgary sample and 307 respondents are in the Edmonton sample. Average respondent age, 47 and 49 years, and education, 14 years, are similar for the Calgary and Edmonton samples, respectively. Annual household income is significantly higher in Calgary, \$92 thousand, compared to Edmonton, \$79 thousand. Seventeen percent of the income variables are imputed using an income regression that has an R-squared value of 0.27. In this model income increases with education and age (at a diminishing rate). Income is higher for males and married respondents. The average distance to downtown Calgary and Edmonton is 14 and 19 kilometres. Ten percent and 22 percent of the Calgary sample lives and works downtown while 6 percent and 16 percent of the Edmonton sample do so. A slight majority of Calgary respondents is male and a slight majority of the Edmonton sample is female. Two-thirds of both samples are married and three-fourths of both samples own property in the metropolitan area. The average number of years lived in Calgary and Edmonton is 24 and 31.

Respondents were asked about their beliefs about downtown's impact on quality of life. Downtown Calgary and Edmonton were very important or important for quality of life for 75 percent and 71 percent of respondents. Forty percent and 31 percent of Calgary and Edmonton residents think that a lively downtown is important for a city to be great. By comparison, a new

NHL arena is very important or important for quality of life for 57 percent and 48 percent for Calgary and Edmonton residents, regardless of whether it is downtown or not.

CVM SCENARIO AND WTP

To estimate respondents' willingness to pay for a downtown hockey arena to enhance civic pride and the quality of life, the survey asked respondents to consider a hypothetical scenario:

Suppose the [Flames or Oilers] decide to build a new, state-of-the-art hockey arena [in a complex that would also include a casino, affordable housing, arts and cultural space including galleries, theatres and museum space] in downtown [Calgary or Edmonton] to replace the [existing arena]. [Suppose environmentally friendly materials and design will be used]. Some people say that building the [development] downtown would improve the quality of life in [Calgary or Edmonton] more than building it in the suburbs.

The brackets denote where city-specific information or randomly-chosen variations in the arena development were inserted. Because proponents of downtown arenas often argue that they are most effective when included in a multifaceted development, the hypothetical scenario presented to respondents varied randomly so that one fourth heard each of the following descriptions of the development: 1) an NHL arena, 2) an arena and a casino, 3) an arena, a casino, and affordable housing, or 4) an arena, a casino, affordable housing, and arts and cultural space. For each of the

different combinations, half of the respondents were told the development would incorporate green design and building features, while the other half were not.⁴

After the scenario description, respondents were told that building a new arena downtown would cost more than building it in the suburbs, and were asked if they would vote for a referendum to pay the extra cost of building the arena complex downtown.

To pay the extra cost of building the arena [+housing, cultural complex, and casino] downtown, the government could impose an annual property tax surcharge of [\$5, \$15, \$25, or \$50] on each house and apartment for 5 years. Suppose that this proposal were put to a referendum vote. If more than half of all voters were in favor of the proposal then it would pass. Remember, if the proposal passed, each household would have [\$5, \$15, \$25, or \$50] less to spend on other things each year for 5 years. Do you think you would vote for or against the proposal?

To allow adjustment for hypothetical bias (Loomis, 2011; Johnson and Whitehead, forthcoming), those who said they would vote for the proposal were asked to rate on a scale of 1 to 10 how certain they were that they would vote for the proposal if it were really put to a referendum. If they said they would vote for the tax increase, but with certainty of 6 or lower, they were coded in the data as voting against the referendum.

EMPIRICAL MODEL

⁴ A casino figured in our survey due to the fact that the preferred downtown site in Edmonton had an existing casino and discussion surrounded the potential inclusion of this into a new development. In Calgary, the team owners had previously pursued a casino license.

To estimate the determinants of willingness to pay for a downtown arena several probit models were estimated. The biggest single determinant of willingness to pay for a downtown arena is whether respondents think that a new arena will improve the quality of life in their city. Those who believe a downtown arena will improve the quality of life are much more likely, *ceteris paribus*, to vote for the referendum than are those who do not believe the quality of life would improve. This is an important finding as it shows that supporters of the downtown arena are those that “buy in” to the logic that an arena that hosts a major sports franchise and other entertainment events can positively improve the vibrancy of a city’s downtown. In the sample of 607, 316 respondents believed that a new downtown arena would improve the local quality of life. Of those 316, 148, or 47 percent, are fairly sure that they would vote for in favor of higher taxes to pay for the downtown location (i.e., *FORSURE*=1). But among the 291 who do not believe a downtown arena would enhance the quality of life, only 27, or 9 percent, are fairly sure they would vote for the referendum.

Given the strong correlation between *ARENAQOL* and *FORSURE*, the question arises: are there unobservable characteristics that affect both the probability of voting for higher taxes and those who believe that a new arena would improve the local quality of life? To answer this, a bivariate probit model is estimated:

$$\begin{aligned}\pi(FORSURE) &= \Phi(DOWNTOWN, QOL, DEMOS, ARENA, LNTAX; \beta_1, \varepsilon_1) \\ \pi(ARENAQOL) &= \Phi(DOWNTOWN, QOL, DEMOS; \beta_2, \varepsilon_2)\end{aligned}$$

where $\pi(\cdot)$ is the probability function, $\Phi(\cdot)$ is the standard normal density function, β is a vector of coefficients and ε are error terms. The correlation in error terms, $\rho(\varepsilon_1, \varepsilon_2)$, is the correlation of error terms and reflects the correlation of unobservable factors affecting both *FORSURE* and

ARENAQOL. FORSURE is a dummy variable equal to 1 for respondents who are certain they would vote for higher taxes to subsidize a downtown arena. The variable ARENAQOL is equal to 1 if respondents think downtown in general is important to the local quality of life.

The DOWNTOWN vector contains variables measuring the respondents' relationship to their local downtown, whether they live (LIVE), work (WORK) and own property (PROPERTY) there. If they do not live there, KILOMETRES is their one-way distance from downtown. These variables provide an indication of the degree to which respondents consume downtown goods or the time costs of going downtown. If people who use downtown for living, working, and recreation think a downtown arena will enhance downtown attractiveness, they should be willing to pay more for a downtown arena rather than a suburban arena.

The QOL variables attempt to measure whether downtown public goods, particularly those related to quality of life, affect willingness to pay. LIVEGREAT is a dummy variable equal to 1 if a respondent believes a "lively and prosperous downtown is necessary for a city to be great." The variable DTIMPQOL is equal to 1 if respondents think downtown in general is important to the local quality of life. The DEMOS vector contains demographic variables to allow testing whether tastes and life circumstances affect willingness to pay. Does WTP vary with sex (MALE), age (AGE), education (EDUC), income (INCOME), marital status (MARRIED), the number of years lived in the current city (TENURE)?

The ARENA vector consists of dummy variables capturing the different dimensions—arena, casino, affordable housing, arts and cultural space, green building techniques—of the arena development as described in the hypothetical scenario. Inclusion of the arena dimension variables will allow testing for scope effects, that is, whether willingness to pay for a downtown

arena differs with various combinations of additional amenities included in the arena development. If scope effects exist, it will provide evidence corroborating the claims that multi-faceted developments containing more than an arena or stadium do more to enhance the quality of downtown than do stand-alone sports developments. LNTAX is the log of the amount of the annual tax increase contained in the referendum question on the survey.

EMPIRICAL RESULTS

Responses to the referendum question are summarized in Table 2. In both Calgary and Edmonton, the referendum would fail even at the lowest dollar amount. As the dollar amount rises from \$5 to \$50, the percentage of “for” votes falls from just under 50 percent to 31 percent in both cities. Overall, 38 percent in Calgary and 40 percent in Edmonton would vote in favor of a tax increase. After recoding the “for” votes to include only those who said they were certain at a level of 7 or higher, 27 percent and 31 percent favor the referendum in Calgary and Edmonton. These relationships are marginally statistically significant according to the chi-square. The Turnbull lower bound willingness to pay is estimated from Table 2 (Haab and McConnell, 2002). Willingness to pay is about \$18 for both Calgary and Edmonton. After recoding the “for” votes willingness to pay falls to about \$13 in both cities.

Table 3 shows the bivariate probit results for Calgary and Edmonton. While we find few variables that are determinants of ARENAQOL, the positive and statistically significant bivariate correlation coefficients indicate that respondents who are willing to pay higher taxes for a downtown arena are also more likely to believe that an arena would improve the quality of life for some unmeasured, underlying reason. The bivariate probit models represent a gain in efficiency over two independent probits that estimate the factors that affect referendum votes and

attitudes about quality of life and hockey arenas.

Considering the CVM scenario variables, the probability of voting for in the referendum falls as the amount of the tax increase rises. But, respondents in Calgary and Edmonton regard the arena dimensions differently. While neither housing nor arts and cultural space affect the probability of a “for” vote in the two cities, a casino and green building techniques do.

Calgarians do not care one way or another about a casino, but Edmontonians find the idea of a casino in the arena complex to be attractive. Calgarians are more likely to vote for a downtown arena complex if it is built with green techniques. These are the first scope effects found in a sports CVM study.

Few demographic variables affect either dependent variable. While income has a statistically insignificant effect on the probability of a “for” vote in Calgary, income in Edmonton has a much larger, positive, and highly significant effect on the probability of a “for” vote. Older respondents in Edmonton are less likely to vote “for” in the referendum and are less inclined to think that a downtown hockey arena will improve the quality of life.

The results on the downtown variables suggest that people who use downtown more intensively tend to value a downtown arena complex more than do those who use downtown less intensively. Living downtown has a positive and significant effect on the probability of “for” votes in both the Calgary and Edmonton models. In contrast, for those respondents who do not live in downtown Calgary, increasing distance from downtown increases the probability of an “against” vote. Respondents who own property downtown feel that a downtown arena would lower the quality of life. In Edmonton, the number of years living at the current residence

increases the probability of a “for” vote and the attitude that a downtown arena will improve the quality of life.

The result on the hockey attendance variable suggests that some portion of total willingness to pay is for use value, i.e., the consumption of private goods. Respondents who actually attended a home game in the most recent season are more likely to vote “for” in the referendum, even though the hypothetical scenario made clear that the choice was between a new arena downtown or in the suburbs, not between a new arena and the existing arena. As with the downtown variables, the hockey attendance result suggests that those who see a direct benefit to themselves are more likely to favor subsidies for a downtown arena.

Two variables were included specifically to measure the impact of downtown public goods on willingness to pay. Respondents who said they believe a “lively, prosperous downtown is necessary for a city to be great” are more likely to vote “for” in the referendum in Edmonton and also think that a downtown hockey arena will improve quality of life. Respondents who believe that a “lively, prosperous downtown will improve a city’s quality of life,” are more likely to vote “for” in the referendum in both Calgary and Edmonton and also think that a downtown hockey arena will improve quality of life.

To determine whether the extra costs of building an arena complex downtown rather than in the suburbs can be justified, the individual household annual willingness to pay must be capitalized and aggregated over the entire city. This will provide an estimate of the present value of the benefits produced by a downtown location that can be compared to the costs of a downtown location. Table 4 shows the discounted present values of the estimated household WTP values from Table 2, approximately \$18 in both cities if unadjusted for hypothetical bias,

and about \$13 if adjusted for hypothetical bias. In discounting the annual benefit streams to get the capital values, we employed a 5 percent discount rate—using a lower discount rate, even 0 percent, would not materially alter the conclusions we draw below.

To aggregate the capital values across households, we multiplied the estimated capital values per household by the total number of households in the Edmonton and Calgary metropolitan areas. This provides an upper bound to the capital values because it assumes that the non-respondent households, had they answered the surveys, would have answered them in the same way as the respondent households. It is likely, however, that a higher proportion of nonrespondent households than respondent households are unwilling to pay anything—that is why they refused to answer the questions.

After discounting and aggregating, the estimated benefits of a downtown location for a new arena complex is about \$33.2 million, unadjusted for hypothetical bias, in both cities. Adjusted for hypothetical bias, it is about \$24.1 million in Calgary and about \$24.6 million in Edmonton. These figures represent upper bounds, since they assume non-respondents are identical to respondents. Current estimates for the total cost of a downtown arena complex in Edmonton run about \$450 million (Kent, 2012). If the same complex would cost less than \$425 million in another location, the costs of a downtown location would exceed the benefits as measured by willingness to pay for the arena’s contribution to the vibrancy of the downtown.

CONCLUSIONS

In this paper we extend the sports CVM literature by estimating the willingness-to-pay sports public goods in the downtown. We provide the first evidence of scope effects in sports CVM studies, providing further evidence of the validity of the CVM in the sports context.

A broad question illuminated by these results is the question of whether downtowns produce valuable public goods that suburbs do not. Based on the survey results in both Calgary and Edmonton, it appears they do. Most respondents said a lively and prosperous downtown improves the quality of life and engenders a sense of pride. Though many do not believe an arena complex will improve downtown, those who believe it would are willing to pay more for a downtown arena than a suburban arena. Also, even if respondents do not support higher taxes for an arena, some respondents may well support higher taxes for other development projects downtown, so long as they believe the projects would enhance the quality of life. While these survey results cannot be used to derive the value of downtown public goods such as civic pride and community identity, they do suggest that the value of such goods may be quite large. However, the magnitude of those benefits, as demonstrated in Table 4, may not be large enough to justify a downtown location. If the costs of the project are increased by 7 or 8 percent by building it downtown, the costs begin to exceed the benefits. The results of this study should be of interest to those concerned with revitalizing downtowns. Based on the results of this study, there are clearly public goods produced by downtowns. The broader question for urban planners to consider is what mix of development projects and amenities is most appropriate for a given city, and how public money will be best allocated to improve quality of life in their respective communities.

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Variable	Description	Calgary		Edmonton	
		Mean	Std.Dev.	Mean	Std.Dev.
AGE	age of respondent	47.34	14.88	49.36	16.28
EDUC	years of schooling	14.44	2.08	14.07	2.48
INCOME	household income (\$1000s)	91.95	40.32	79.01	40.02
KILOMETRE	distance from downtown	14.38	11.19	18.82	15.87
TENURE	years lived in city	23.86	15.61	31.18	18.08
LIVE	1 if lives downtown	0.10	0.30	0.06	0.23
MALE	1 if male	0.53	0.50	0.47	0.50
MARRIED	1 if married	0.66	0.47	0.67	0.47
PROPERTY	1 if owns property in metro area	0.76	0.43	0.75	0.43
WORK	1 if works downtown	0.22	0.41	0.16	0.37
ARENAQOL	1 if respondent believes downtown arena will raise quality of life	0.57	0.50	0.48	0.50
DTIMPQOL	1 if lively downtown improves quality of life	0.75	0.43	0.71	0.45
LIVEGREAT	1 if a lively downtown is necessary for a city to be great	0.40	0.49	0.31	0.46
Sample size		300		307	

Table 2. Referendum Votes and Willingness-to-pay						
	Calgary					
	For			For Sure		
Cost	For	Total	%For	For	Total	%For
5	38	79	48%	28	79	35%
15	24	76	32%	16	76	21%
25	29	74	39%	21	74	28%
50	22	71	31%	16	71	23%
Total	113	300	38%	81	300	27%
χ^2 (df)	6.29(3)	p=0.09		5.01(3)	p=0.17	
Turnbull WTP	\$17.58	t=9.79		\$12.73	t=7.77	
	Edmonton					
	For			For Sure		
Cost	For	Total	%For	For	Total	%For
5	38	77	49%	32	77	42%
15	30	77	39%	22	77	29%
25	31	78	40%	24	78	31%
50	23	75	31%	16	75	21%
Total	122	307	40%	94	307	31%
χ^2 (df)	5.57(3)	p=.13		7.53(3)	p=.06	
Turnbull WTP	\$18.01	t=9.16		\$13.35	t=7.59	

Table 3. Bivariate Probit Models

	Calgary				Edmonton			
	FORSURE		ARENAQOL		FORSURE		ARENAQOL	
Variable	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Constant	-1.514	-1.782	0.021	0.031	-1.441	-1.814	-0.355	-0.561
LNA	-0.220	-2.295			-0.175	-1.824		
GREEN	0.298	1.730			-0.189	-1.116		
ARTS	-0.085	-0.369			-0.145	-0.539		
HOUSING	0.122	0.544			-0.024	-0.093		
CASINO	-0.143	-0.530			0.554	2.296		
AGE	-0.003	-0.442	-0.003	-0.447	-0.013	-1.748	-0.012	-1.833
EDUC	0.010	0.204	-0.045	-1.068	0.023	0.556	0.010	0.271
MALE	0.295	1.552	0.000	-0.001	0.112	0.573	0.049	0.311
MARRIED	0.327	1.424	-0.222	-1.072	-0.178	-0.735	0.135	0.688
INCOME	-0.001	-0.345	0.002	0.643	0.008	2.779	0.004	1.488
KILOMETRE	0.017	2.012	0.005	0.551	0.001	0.098	-0.002	-0.403
LIVE	0.913	2.829	0.242	0.784	0.754	1.692	-0.003	-0.009
WORK	-0.133	-0.510	0.219	0.998	0.370	1.498	0.274	1.220
PROPERTY	-0.143	-0.572	-0.272	-1.190	-0.216	-0.835	-0.518	-2.398
TENURE	0.004	0.610	0.004	0.755	0.013	1.772	0.011	1.994
ATTEND	0.361	1.837	0.159	0.850	0.592	2.846	0.018	0.106
DTIMPQOL	0.690	2.539	1.002	4.945	0.596	2.624	0.404	2.190
LIVEGREAT	0.119	0.659	0.196	1.078	0.455	2.272	0.291	1.611
$\rho(\epsilon_1, \epsilon_2)$	0.644				0.711			
Log-Likelihood Function	-317.64				-321.32			
Cases	300				307			

Table 4. Aggregate Benefits					
		Present value WTP ^a		Aggregate Present Value WTP	
	Households	High	Low	High	Low
Edmonton	405,311	\$81.87	\$60.69	\$33,182,812	\$24,598,325
Calgary	415,592	\$79.92	\$57.87	\$33,214,113	\$24,050,309

^aDiscount rate = 5%